

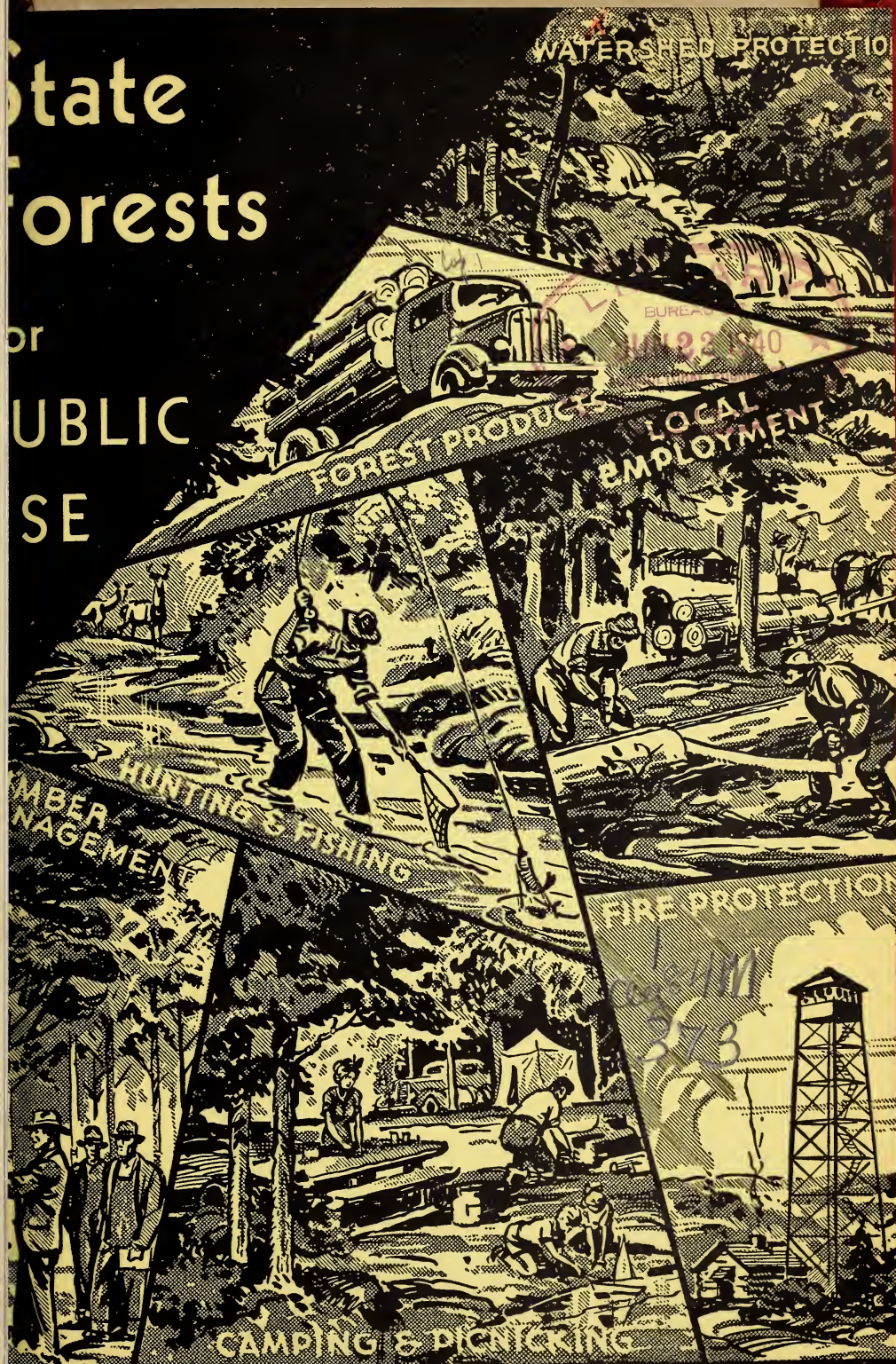
Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

State Forests

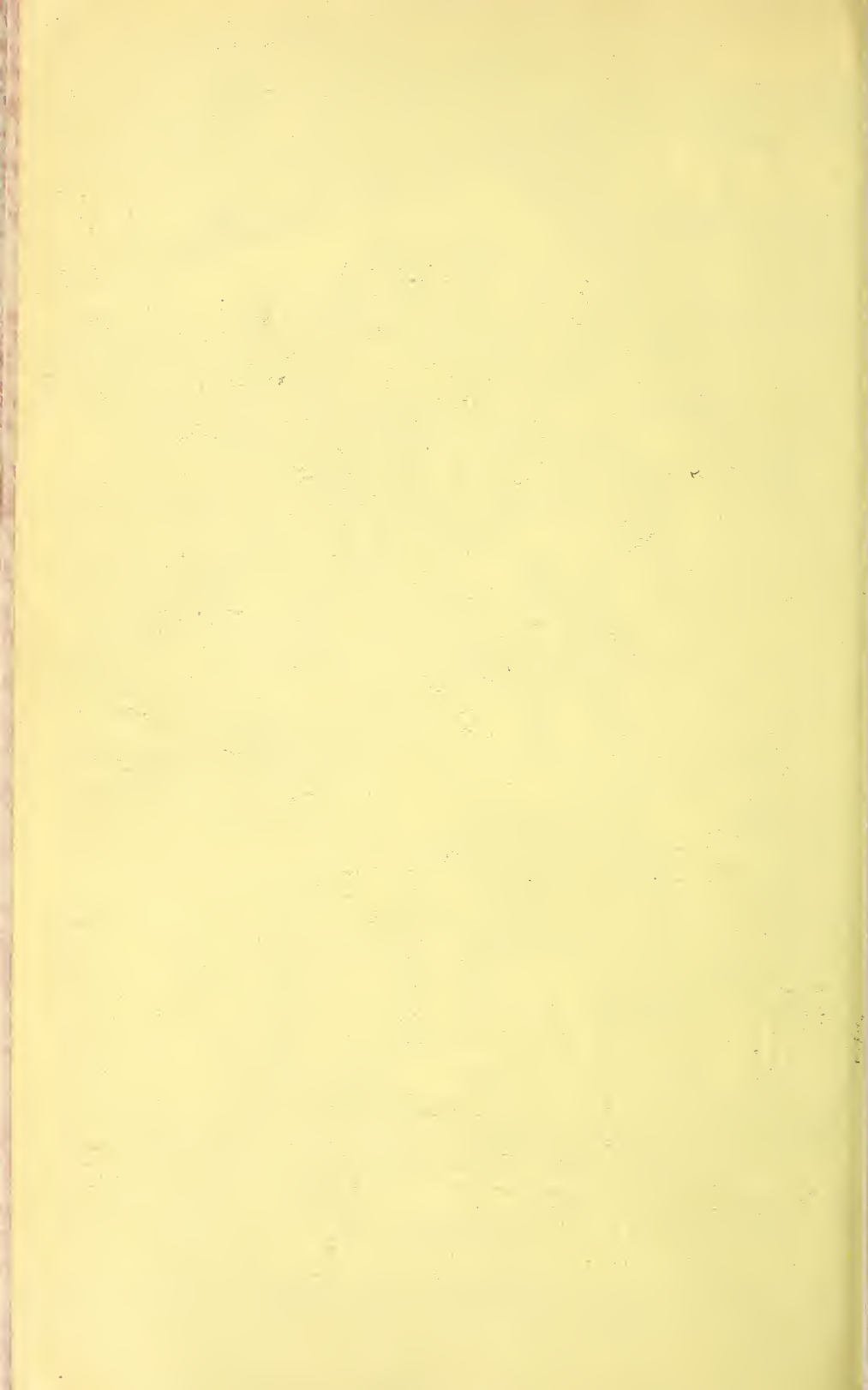
for
PUBLIC
USE

WATERSHED PROTECTION



U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

MISCELLANEOUS PUBLICATION No. 373



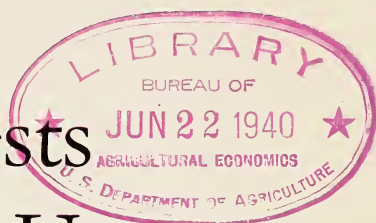
1
Ag 84 M

UNITED STATES DEPARTMENT OF AGRICULTURE

MISCELLANEOUS PUBLICATION No. 373 - - ISSUED MAY 1940

cat 1

State Forests For Public Use



Prepared in the
Division of State Cooperation
FOREST SERVICE

UNITED STATES GOVERNMENT PRINTING OFFICE • WASHINGTON : 1940

For sale by the Superintendent of Documents, Washington, D. C. - - Price 10 cents

Contents

	Page
Introduction	III
Why State forests?	1
Forests in 39 States	2
Stabilizing the uplands	3
Legislation and leadership	5
Progress in protection	8
Areas of many uses	10
Sharing the forest benefits	11
Hunting privileges for all	15
More fish for fishermen	17
Products of the forests	18
Demonstrating forest practices	21
Reforestation the wild lands	23
Searching for new methods	25
Buildings and improvements	26
Planning future programs	29

Introduction

Progress in State forestry has been stimulated by Federal assistance since 1924 when Congress passed the Clarke-McNary Act authorizing cooperation with the States in forest-fire control measures with a view to the protection of forest and water resources and to the continuous production of timber on lands chiefly suitable for the purpose. Under this cooperative program definite forest-land policies and action programs have been initiated.

Protection of forests from fires and rehabilitation of devastated areas are needed to insure the social and economic stability of forest communities and workers. The possibilities of State forests as administrative centers in a broad conservation program on private lands have been demonstrated. The effectiveness of the field organizations is measured, however, largely by the available equipment and funds. Much remains to be done to improve present methods and to extend operations to cover areas as yet unprotected.

The future livelihood of many communities is dependent upon the speed with which the forest-conservation program can be expanded. The one-third of our continental area classified as forest land must be protected and so managed that it will support its fair share of the population. State ownership and supervision of certain forest lands are now definitely recognized as means to this end. Additional millions of acres of tax-delinquent and devastated lands must eventually be brought under State or Federal custodianship. Consolidation of much of this land in additional State-owned forests will facilitate expansion of organized fire protection to all forest lands.



INDIANA DEPARTMENT OF CONSERVATION

Woodland Road in the Clark County State Forest, Ind., used by thousands of people each year. The trees are second-growth hardwoods, the tract having been cut over in 1908 for cross-tie timbers.

Why State Forests?



MILLIONS OF ACRES of land unsuited for agricultural use, cut over and cleared of forest growth during the period of land settlement, are now awaiting return to public ownership. Some steps have been taken by Federal agencies to purchase certain areas of such lands under a varied program of acquisition, which leaves the residue to be rehabilitated by the State in which it is located. By and large, ownership and management of the smaller blocks of from 10,000 to 100,000 acres must be assumed by the States themselves.

In many cases it has been up to the States to take over, and to make productive, lands which no one else wanted. A program of acquisition was virtually forced upon them although they had very inadequate organizations. The State forestry departments accepted the challenge that was presented. More State forests were established. One of the basic objectives in their establishment was to protect the land and its renewable resources in order to provide a steady flow of products for use in local communities.

Such forests as that in Pine Creek Gorge, Pa., which is shown here, are being acquired by many States in the East primarily for watershed protection and flood-control purposes.

PENNSYLVANIA DEPARTMENT FORESTS AND WATERS . 1 .



Forests in 39 States

THIRTY-NINE STATES have an aggregate area of approximately 13,400,000 acres in State forests in 732 units. Of the 9 States which have no State forests, 4 are in the Plains region. All the States bordering our extensive seacoasts and Great Lakes, in most of which lumbering has at some time been heavy, have, with two exceptions, established State forests. Along our northern border, with one exception, all the States have such forests, those in Minnesota and Michigan being first and fourth in point of area. Two Plains States, Kansas and Texas, also have State forests.

In the three States having the largest acreage of State forests lumbering was heavy in the latter part of the nineteenth century. The area now organized as State forests includes largely cut-over and tax-delinquent land.

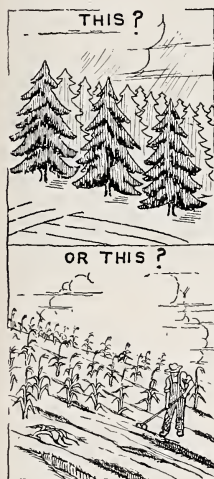
A review of the State forest areas indicated in table 1 (p. 33) shows the spread of these properties in sections where they can best serve the States' needs. New York, for example, has in all 2,674,473 acres in 310 properties classified as State forests and forest parks under supervision of the Division of Lands and Forests. Minnesota has 31 State forests in which there are 5,338,238 acres. New Hampshire, with 42,164 acres in State forests, has 113 such units. Tennessee, one of the first of the Southern States to start a forestry program, now has 40,000 acres in 8 forests. Twelve States, with State forest areas of from 588 to 448,000 acres, have 1 forest each.

Typical area of uplands in State ownership. Unfit for farming, these uplands nevertheless can be made to produce timber and other useful materials and otherwise may greatly influence the prosperity and well being of the people in the lower valleys.

PENNSYLVANIA GAME COMMISSION



Stabilizing the Uplands



IT HAS BEEN SAID that conservation demands the wise use of valleys. The valleys provide good home sites on or close to rich agricultural soils where the residents may produce grain for livestock and for market, pasturage, and truck crops. Beyond the valleys, the hill lands, properly managed and protected, can be made to provide sawlogs, posts, poles, pulpwood and other raw materials needed by valley industries, to serve also as a source of part-time employment for local laborers. Maintenance of adequate forest cover on the upper areas is also essential in order to prevent floods and destruction of property in the lowlands. Soil on the hill and mountain slopes must be held in place as the initial step in any broad program of land management designed to insure continuous production of crops on the lower, fertile valleys.

The forest is considered the most effective cover or natural reservoir for impounding water. Rain and snow are checked by the litter and duff, each twig and leaf serving as a tiny dam. Instead of running off, the water filters through the soil and is gradually released as springs and small creeks. Stabilization of the upland by means of forests reacts, therefore, to the advantage of many urban communities which are considerably removed from the area but must depend upon it as a never-failing source of water for domestic and industrial use.

Forest cover on extensive watershed areas has also proved most effective in reducing the peaks of annual floods. Clearing and burning of forest areas in the uplands may cause critical flood conditions in the lower valleys, the seriousness of which sometimes results in virtual depopulation of valuable agricultural and industrial communities. Slopes that have been abandoned for agricultural purposes are such a vital factor in flood control that they create a problem that is demanding the combined efforts of State and Federal authorities.

Many of the areas acquired by the States are abandoned hill farm lands left impoverished by succeeding generations of owners. The work of restoring these worn-out lands to forests is not easy. After title has been



TENNESSEE FOREST SERVICE

The first job on lands acquired for State forests is often gully and erosion control on abandoned fields.



F-310020

Reforestation of lands denuded by strip mining has proved effective in several States. On this area a new forest of mixed species is making rapid growth.

acquired in the name of the State or Commonwealth, the slow process of revegetating the slopes begins. Gullies are plugged with small dams and grasses, or other temporary quick-growing crops are sowed to hold the remaining soil in place until trees can be planted for a permanent cover. Coupled with the natural forest, scattered plantations in time transform the landscape from one of gully-scarred fields and woodlands to a solid forest of high potential value, with new uses and activities developing as reforestation progresses.

Legislation and Leadership

MANY OF THE PROBLEMS in the adjustment of land use in the various States are of long standing. In Wisconsin, for example, as early as 1867 men who had witnessed the widespread destruction of forests in the Eastern States attempted to forestall a similar catastrophe and obtained enactment of a law appointing a forest inquiry commission of three members. The first consideration of a State forest policy, however, was made by the Maine State Board of Agriculture in 1869 which appointed a committee to consider the preservation and production of forest trees. Other boards or commissions were appointed by New York in 1872, Connecticut in 1877, New Hampshire in 1881, Vermont in 1882, Ohio in 1885, Pennsylvania in 1887, and North Carolina in 1891.

Early efforts of these boards or commissions focused the public eye on the danger of forest fires, the results of forest destruction in floods, and damage by erosion. They called attention to the growing need of the young Nation to conserve its soil, forests, and other natural resources. They sponsored early legislation to protect remaining forest lands from fire, disease, and insects. The individual members of the commissions often contributed their time and money to arouse public interest.

California in 1885 appointed the first State board of forestry to administer forestry activities. In the same year Colorado, Ohio, and New York appointed similar boards or commissions. Of these four States, New York alone has had uninterrupted administration of its forest resources. In the following years other States appointed administrative forestry boards—Maine in 1891; New Hampshire in 1893; Wisconsin, Minnesota, and Pennsylvania in 1895; and Oregon in 1899. A similar board appointed in Utah in 1896 is no longer in existence. These boards, in a number of cases, secured



MINNESOTA DEPARTMENT OF CONSERVATION

Numerous State forest areas have been opened up through roads constructed by the C. C. C.

passage of enabling legislation to establish State forests by tax reversion and gift or purchase of lands unsuited to other forms of agriculture.

Despite the fact that approximately 60 percent of the land area of our Southern States is best adapted to forests, many of them did not have

organized forestry departments until 1923 to 1927. Arkansas, among the States most recently to organize a forestry commission, has made very rapid progress in developing a State program. Only five States are now without regularly constituted forestry departments.

To meet the problem of rehabilitating misused and idle lands new techniques had to be developed. It was necessary to devise and initiate a fire-protective system, determine the best methods and species for reforestation, and institute cultural practices to improve existing forest cover. These measures represent the first steps in a broad forestry program.

Attempts by the States to assist private forest landowners have been primarily concerned with the protection and reforestation of lands. During the settlement period, pride in landownership was expressed in the number of acres cleared. Partly because of State leadership, progress in forestry regions is now being expressed in the number of acres planted and managed for future forest crops.

The States with organized forestry departments soon found they needed well-qualified men for constructive leadership and supervision of personnel to protect and manage lands effectively and to answer questions of private landowners.

In most cases, offices were established in the State capitals. However, at a very early date the State foresters found it difficult to do business at long range, especially since transportation facilities were limited to horse and buggy travel from the common carriers. Local districts were therefore set up to provide more adequate supervision. The district foresters carried on for a number of years a program of education to arouse local interest in the value of the timber resources. With little or no equipment, these men formed a skeleton protection organization in the States where the forest-fire problem was greatest.

Towns and communities soon began to show some interest in the acquisition of State forests. Where large areas for State administration were not available, the State department was often assisted by local authorities in acquiring and improving, as well as administering lands which in many cases were the sources of water used for domestic purposes by cities and towns.

In recent years the State administration of forest lands has been given considerable impetus by the C. C. C. program. In fact, it has been estimated that the forest-conservation program in most States has been advanced from 20 to 25 years through the availability of C. C. C. labor.

Progress in Protection



THE TREMENDOUS JOB being supervised by the State foresters is best indicated by a review of the areas under protection. (See table 1.) The State departments in the majority, have assembled and placed in the field, organizations to combat forest fires on State and private lands.

Forest lands in need of protection, exclusive of farm woodlands and of areas within national forests and parks, total more than 407,000,000 acres within the States and Hawaii. Of these lands, almost 253,000,000 acres are now under protection on a cooperative basis, with the States providing the supervision. Organized protection has now been established in 39 States and the Territory of Hawaii with the assistance of the Federal Government.

The State forest in many cases becomes the administrative headquarters or center for protective operations over a large district. The district itself may extend far beyond the public-forest boundaries to take in from 6 to 10 counties. Within this unit, a small organization, consisting of district and county wardens, provides the leadership and supervision for fire prevention, detection, and suppression. The fire-control organization is the key-stone around which public- and private-land management in the district is built. It provides a means of low-cost services to the community, the value of which has been well demonstrated.

Progress in forest protection in the States under the cooperative program is well illustrated by experience in South Carolina. In 1931, shortly after the State forestry department was organized, only 607,000 acres of forests in

Construction of fire lines is a part of State presuppression activities in the South.

FLORIDA FOREST SERVICE



the State were being given organized fire protection. In that year 8.2 percent of the forest area protected was burned. The average fire burned over 258 acres. By 1936 the protected area in the State had increased to 3,165,000 acres, the area burned over annually had decreased to only 1.14 percent, and the average size of fires had dropped to 34 acres.

Aside from serving as fire-control headquarters, the small State forests are also usually well located to serve as centers in combating insects and diseases. The spread of white pine blister rust, for example, has been checked although not completely eradicated by the combined efforts of State and Federal authorities in regions where the valuable white pine is the basic resource of the lumber industry. The eastern forests, particularly in the Northeast, have been subject to the ravages of the gypsy moth and other insects. Small public forests in this region have proved invaluable as concentration points for equipment and personnel used in combating these insects.

State forest fire-control men fighting fire. Through the State organizations, protection is given not only to the State lands but also to wide areas in private ownership.

MINNESOTA DEPARTMENT OF CONSERVATION

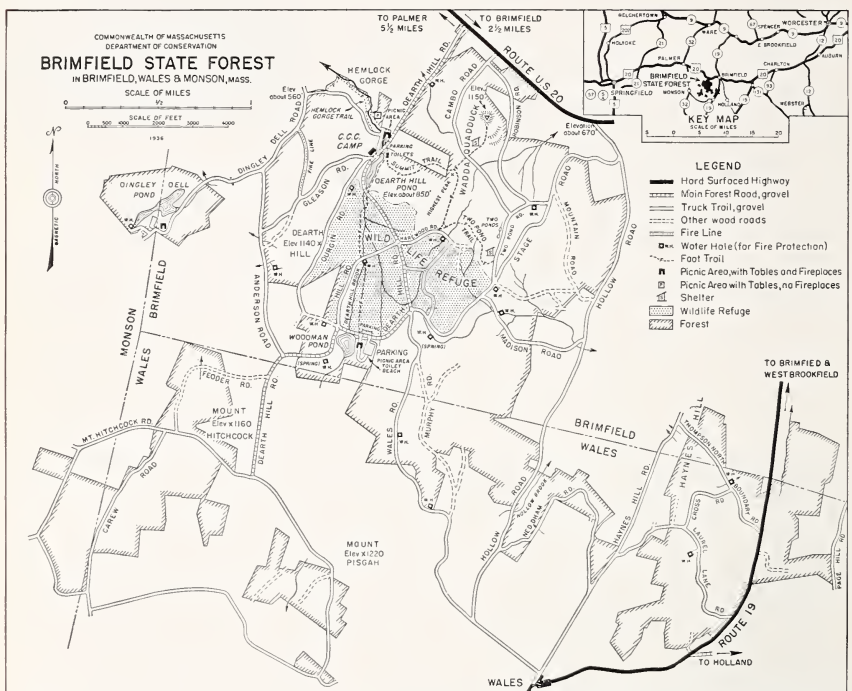


MICHIGAN DEPARTMENT OF CONSERVATION
Fire towers at strategic points in State forests overlook wide areas of both public and private lands.



Areas of Many Uses

ASIDE FROM trying to protect forests from fires, insects, and diseases, there are many activities being undertaken by the State forestry organizations as illustrated in the Brimfield State Forest near Springfield, Mass., which is typical of public-use units east of the Mississippi River. Acquired as a



MASSACHUSETTS DEPARTMENT OF CONSERVATION

Diagram showing the many uses of and activities on a typical eastern State forest. In the center is a wildlife refuge. Parking space and picnic areas have been set aside at Woodman Pond, Hemlock Gorge, and Dingley Dell Pond.

part of a 175,000-acre reforestation program, this area is in a densely populated section of the country and is subject to intensive use.

Considerable emphasis has been given to the protection of wildlife in a central refuge in the Brimfield forest. Contrary to common belief, the con-

trolled cutting of timber in this area produces habitat and food conditions favorable to both birds and animals. The planted and natural forest outside the refuge is open to hunting and fishing in accordance with fish and game laws. Permits must be obtained from the forest superintendent.

In order to avoid complications that might arise if the public were allowed to use the forest indiscriminately, parking space and picnic grounds have been set aside. Heavily used are those located near Dingley Dell, Dearth Hill, and Woodman Ponds. Improvements at these points include both tables and fireplaces. In Hemlock Gorge there is an additional picnic ground where tables are available, but no fireplaces.

Foot trails lead to prominent points in the mountains affording good views of the surrounding country. Shelter houses have been built at these places. These foot trails serve not only the people using the forest, but also open up isolated sections and provide a means of fire protection. Fire lines have been run to bisect areas of hazardous fire conditions.

The network of main forest roads and truck trails has been designed primarily to permit the removal of forest products. Although it may appear that the major activities are recreational, actually only a small amount of land is so used. The gross area is devoted to timber crops. All products removed through thinning and improvement cutting are finding a ready market in the nearby densely populated areas.

Sharing the Forest Benefits



MORE AND MORE the general public is sharing the forest benefits. Shorter working hours in many occupations have permitted more people to take to the woods and trails, not only on week ends but also for longer periods during all seasons of the year. Public use of the State forests has increased accordingly. The latest available figure shows approximately 28,000,000 persons visiting them in a single year.

New facilities have had to be developed to meet needs of the visitors and it has been necessary to provide more public-use areas. In the East, particularly, thousands of acres have been purchased by the States and improved primarily as campgrounds, picnic areas, and for similar uses. The popularity of the State forests has increased so rapidly that, even with

the combined efforts of the C. C. C. and State departments, it has not been possible to provide adequate facilities for convenience of all visitors. As a result of more intensive use, also, maintenance problems have been created, requiring more supervisory personnel, laborers to maintain roads, buildings and grounds, and fire lookouts. Telephone lines and fire-fighting equipment have had to be kept in working order for a much longer season each year. Costs of administration have increased in proportion to the greater use, and additional personnel have had to be added for adequate supervision.

One of the oldest forms of forest recreation is picnicking. It becomes more popular each year. Many roads in State forests are now being constructed to provide attractive approaches to picnic areas. Along the roads also at frequent intervals picnic spots are being set aside, and thousands of people annually are bringing their families and friends to use them. Other picnic areas have been located where streams could be dammed. In some sections where there were no flowing streams, surface run-off has been impounded to create bodies of water. In some State forests swimming pools have been developed by using natural holes created by waterfalls.

Improvements for the use of the public have been installed in most of the picnic areas. They are not elaborate, consisting of rough fireplaces, tables, pure water supplies, and sanitation equipment. Usually no charges have been made for their use.

Many families drive to the picnic grounds by automobile. Without the public-use areas and facilities provided by the State forestry departments, the opportunity would not often be available to them to enjoy the pleasures of a forest outing and the abundant recreational benefits of the forests, except at much greater cost.

Thousands of city dwellers now plan annual vacations that take them to the wide, open spaces along northern lakes. In the Lakes region some of the States have secured title to valuable lake shores and beaches for public use. One State forest in Michigan, for example, borders Lake Superior. As yet it is in primitive development, but is available for use by those pioneering individuals who want to get away from group camping.

With the advent of automobile trailers, camping in the open has become more attractive. Car owners now pull their trailers into the deep woods bordering lakes, where they spend their summer vacations fishing and bathing. It is, therefore, becoming necessary to develop trailer camps.

New York has one publicly owned lake around which there are 500 camp sites, each with its individual fireplace and picnic table. They are spaced far enough apart to provide sufficient room for cars, trailers, or tents to be used by the visiting families or groups. During June, July, and August this camp becomes a busy community, and local farmers, dairymen, and grocerymen cater to the needs of the summer visitors by delivering produce directly to the camp.



F-3489E9

UPPER LEFT.—Improvements are provided at minimum cost on State-forest picnic grounds which are usually located near lakes or streams.

PENNSYLVANIA DEPARTMENT OF FORESTS AND WATERS

UPPER RIGHT.—Natural swimming pool created by the running waters of a State forest stream.

MICHIGAN DEPARTMENT OF CONSERVATION

LOWER LEFT.—Tabquamenon Falls, one of the recently acquired beauty spots attracting visitors to the Lake Superior State Forest, Mich.

NEW YORK DEPARTMENT OF CONSERVATION

LOWER RIGHT.—State-forest campgrounds located on a lake providing fishing and boating.

The forest campgrounds are usually built on a lake with a good sand beach for bathing and with boats available for use in fishing. In some cases overnight facilities are provided near beauty spots, as at Tahquamenon Falls, Lake Superior State Forest, Mich.

It was estimated recently that in 1 year the public paid out approximately $4\frac{1}{2}$ billions dollars for motor vacationing. Part of this money was spent by tourists in State forests and in traveling to and from them. Many local residents derive their livelihood from activities dependent on these properties. Among others, operators of filling stations, hotels, lunch-rooms, and similar businesses providing necessary services to the traveling public have benefited directly from the increased use of the State forests.

Fishing, hunting, hiking, picnicking, and similar recreational activities on the forests do not conflict with the other uses when properly supervised. A short distance back from the picnic areas and beauty spots, timber production may be the major objective. Eventually this timber can be cut and income from it may be used to maintain the recreational activities, or the returns may be used to acquire additional areas.

In some of the State forests provision has been made for permanent summer camps on leased sites. Such permanent summer-home communities are particularly popular in the State-owned forests east of the Mississippi. They lend stability to the forest-development program, and the users pay for the privilege at a very nominal figure. The fees collected are used by the States in building permanent roads, trails, and other improvements.

A few years ago it became evident that some regulatory measures were needed to prevent erection of unsightly cabins or other buildings that might detract from otherwise attractive summer-home areas. The present practice in several States is to require inspection of plans and specifications as a means of preventing construction of undesirable shacks which might impair the recreational use of the forests.

In many cases permanent group camps have been set aside on the State properties for Boy Scouts, Girl Scouts, Campfire Girls, 4-H Clubs, and other conservation organizations. These organization camps are usually built on a cooperative basis, the users furnishing or erecting adequate buildings on sites provided by the State. The States are also contributing supervision and instruction in conservation to the groups using the improvements.

A number of the technical forestry schools and universities maintain summer and winter camps in State forests where instruction is given to prospective foresters in the management of public lands. In these camps young men are taught various phases of conservation, planting, thinning, weeding, and other cultural practices which are fundamental in forest-land management. Where mature timber cover is available, the studies may be expanded to include various methods of logging, milling, and marketing.

Hunting Privileges For All



STATE FORESTS as public hunting grounds are helping to provide extensive shooting ranges for an army of hunters. More than 6,500,000 hunters in the United States are today looking for more public places to shoot quail, partridge, pheasants, rabbits, squirrels, bears, and deer, which are the most important common species of forest game.

As our urban population becomes more stabilized and as private landowners close their holdings to trespass and hunting, the demand for public hunting areas which are near the centers of population seems destined to increase. In recognition of this, the State forestry departments are cooperating with the State game departments in planting special trees, shrubs, and plants to supply both food and cover to game birds and animals. These efforts increase the hunters' chances of bagging game.

As the wildlife program progresses, it may develop that the game crop in some forests is more valuable than the timber. Logging methods already being applied on certain State forest areas and cutting in some forest types have been designed primarily to increase the game population.



PENNSYLVANIA GAME COMMISSION

Because of a heavy increase in population and consequently excessive killing of game, Pennsylvania had only a few deer left after its timber lands were logged over. Under careful management all game has increased rapidly, and today the deer population demands more range.

The influx of a large number of hunters during dry seasons creates problems in forest-fire control. Precautionary measures are necessary to protect the public interest, especially since man is not always considerate of the rights of others or of the future general welfare. In many cases additional fireguards, patrolmen, lookouts, and other assistants have become necessary to prevent the spread of fires which destroy game, food, and cover.

The State of Pennsylvania offers an outstanding example of game increase as a result of management and forest protection. Twenty-five years ago, because of a heavy increase in population and consequently excessive killing of game following logging its 13 million acres of forest land, Pennsylvania had only a few deer left. Now, however, the deer population in the State has increased to the point where some areas are suffering because of overpopulation. Numerous attempts have been made to thin out herds of deer which have exhausted the food supply in limited woodland areas. In such areas the deer have browsed tender buds and sprouts so closely that the forest has taken on the appearance of an open park with a browse line as high as the deer can reach. The forest continued in this condition cannot reproduce itself, and eventually the deer must find other browsing areas or die of starvation. Pennsylvania is now acquiring more lands for State forests and game refuges where the deer concentration has become serious.

Angler enjoying his favorite sport in a forest stream owned and stocked by the State.



More Fish for Fishermen



THE FISHERMAN has not been forgotten in the development of the State forests. In the rough uplands, where these forests are largely located, are the headwaters of many streams and rivers. Where the vegetative cover is maintained, the streams run clear and cold and offer excellent possibilities for culture and production of fish. The aim in the State forest program has been to increase the production of natural

fish foods to provide conditions favorable to production of large numbers of fish to meet the growing demands of those who depend for recreation upon a rod, a reel and line, and the forest waters. Accordingly, during the last 10 to 15 years, hundreds of miles of trout streams have been improved for fishing by cribbing banks to define the channels, and by building deflectors, dams, and other structures so designed that they speed up and increase aeration of the waters. State forestry officers have been cognizant

Typical inverted V dam used in New York State forests to speed up and increase aeration of stream waters, and to provide spawning grounds for fish.

NEW YORK DEPARTMENT OF CONSERVATION • 17 •



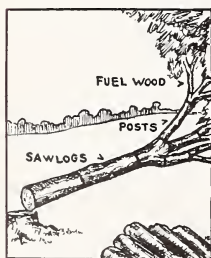
of the needs also for fishing areas for those who prefer to sit and fish, and to satisfy this group boats have been made available for fishing on several of the State-owned lakes.

The States have supplemented the program of providing adequate food and suitable conditions for fish by constructing hatcheries to produce small fish for stocking the streams and lakes.

The popularity of fishing as a form of forest recreation has also forced State conservation officials to develop many other streams which during the last 50 years have been allowed to silt up and become choked with debris. The first steps in this type of reclamation were taken in northern Michigan. Here it was necessary to stake down the stream banks and prevent the soil from flowing into the streams and destroying many favorite fishing holes. Fly fishermen are loyal supporters of this type of stream improvement and are enthusiastic about extending the program to other areas as soon as adequate funds and labor are available.

New York has engaged in a program similar to that in Michigan and, in addition, is acquiring streamside forests and fish streams where they will serve the fishermen from urban centers. More than 400 miles of excellent trout streams have already been leased and are being rapidly improved by the C. C. C.

Products of the Forests



IN DEVELOPING the recreational features of the forests, the original purpose of the State-acquisition and development programs has not been lost. In the majority, they are not yet producing lumber, although some of them are beginning to yield sawlogs. Lands that have come into State ownership have in most cases been logged over by previous owners. Little mature timber remains to be harvested. In some cases young forests are regenerating naturally. On other areas the virgin timber has been so completely cleared that very little natural seeding has taken place and it has been necessary to restore the forest by planting.

The young forests will not yield merchantable lumber for several decades. However, they can be made to yield intangible benefits to the public under proper supervision. Moreover, the young forests of from 1 to 40 years in age produce large quantities of wood products of relatively low sale value.

State forests of from 500 to 10,000 acres are, for example, producing fuel wood from thinning and weeding. Such operations require a relatively large amount of manpower and furnish steady employment to local men, teams, and trucks. Transported to market, the wood harvested in improvement operations becomes a highly desirable product in demand by urban consumers.

Costs of the forest operations in some cases are met by the income from the products obtained. The better trees on the forest, released from competition through overcrowding, are left to grow rapidly into a highly valuable crop of sawlogs. In a well-managed State forest cutting of timber on lands immediately adjacent to roads is held to a minimum, protective strips being left to assure an attractive roadway.

Logs, lumber, and poles are not the only valuable commodities of the forests. Other products also find their way to many markets, the returns from them supplementing small incomes of rural families. The harvesting of these products furnishes desirable seasonal employment to forest people at times when they otherwise would have difficulty obtaining cash to purchase food, clothing, and similar necessities.

Christmas trees from some State forests near metropolitan centers find a ready market. Other decorative material, such as pine and spruce boughs, ferns, and moss, is sold during certain seasons of the year. At various points, large annual incomes are derived from the sale of ferns, pine cones, and such forest plants as laurel and rhododendron. In some sections tanneries and other industrial plants have been sustained by raw materials from State forests.

Picking and marketing blueberries is one of the most lucrative of the seasonal forest enterprises in the north woods sections of the East and in certain of the Lake States. In one State forest of northern Michigan, 500 pickers harvested in 1 year \$80,000 worth of berries from 10,000 acres. A large number of the berry pickers travel from 100 to 250 miles and make

Logs from the Natchaug State Forest, Conn., being unloaded at the sawmill.

F-348966

• 19 •





Blueberries being packed for market on the Lake Superior State Forest, Mich. The berries are a profitable crop here.

MICHIGAN DEPARTMENT OF CONSERVATION



F-348810

Fuel wood from thinnings and improvement work is a product of Connecticut State forests which finds ready sale on nearby markets.

the berrying expedition a vacation for the entire family. They pick berries for 4 or 5 days, and enjoy the fishing or swimming in the State forest lakes for the remainder of their vacation period.

The berry pickers create a problem in fire protection. Blueberries are produced generally within 18 inches of the ground and do not interfere with the growing of timber. Berry pickers hold to the idea that fire stimulates the growth of bushes and causes a greater yield of fruit. Very often they deliberately set fires with the expressed purpose of improving the blueberry range. These fires ruin the timber and the practice is of questionable value to berry production.

The huckleberry pickers in the Pocono Mountains in Pennsylvania also have been a constant fire hazard to the State forest. Recently the State forestry department has initiated an experiment in Monroe County to determine the feasibility of controlled burning. Similarly, the State of Michigan has undertaken studies of the effect of controlled burning on the blueberry crop of the Upper Peninsula.

Demonstrating Forest Practices



THE RELATIVELY small size of State forests is not necessarily indicative of minor importance in the national conservation program. Their multiple-use advantages have been demonstrated in many practices initiated on them.

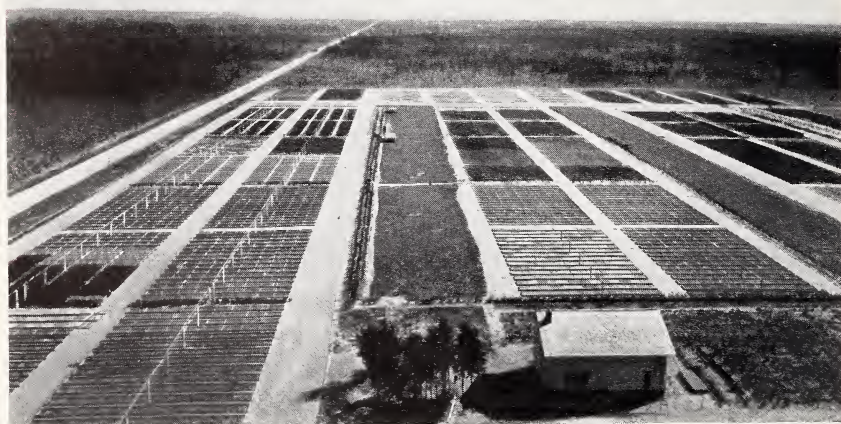
Under scientific management, including day and night vigilance against fire, lands which were in very run-down condition have been made attractive public assets rather than liabilities. The public generally has recognized the values which these forests can provide under proper management.

The number of demonstrations which have been set up on these units and are being checked at frequent intervals by trained technicians is large. Techniques applicable to wide areas are being proved. The demonstrations usually cover general problems in restoration of a desirable and



INDIANA DEPARTMENT OF CONSERVATION

Red pine planting 10 years old in the Clark County State Forest, Ind., one of 117 demonstration plantings along the main forest road.



UPPER.—Plantations on State forests yield marketable products early as a result of thinning and pruning.
PENNSYLVANIA DEPARTMENT OF FORESTS AND WATERS

LOWER.—Reforestation is a big phase of conservation in Minnesota. To meet the demands for planting stock the State maintains this huge nursery in which millions of seedlings are produced annually.

MINNESOTA DEPARTMENT OF CONSERVATION

valuable crop on wild lands. The studies begin with experiments on what types of trees to plant, how far apart the trees should be spaced, and at what seasons in the year plantings should be made for the best results. Later the cultural phase becomes more important, consisting of removing the inferior trees, reducing the number of stems by thinning, and as the trees attain some size, weeding and pruning. In some State forests, growth of the trees is controlled through regulated cutting, demonstrating to local landowners the possibilities of producing timber to fill definite trade specifications.

Reforesting the Wild Lands



REFORESTATION has been one of the major activities of State forestry agencies. Some 676,000,000 trees have been planted on State forests to provide a future timber crop, control floods, furnish food and cover for wildlife, and reclaim abandoned agricultural lands best suited to forests. The latest available figure shows plantings made under supervision of the State departments of 147,000,000 trees on State and private lands in a single year.

The States in the Thirteen Original Colonies were the first to be faced with the land-abandonment problem. Some of these States have been engaged in the replanting phase of forest conservation for nearly 40 years. Some of the older plantations were made with stock imported from Europe, before nurseries were developed in this country. After a few years of experimenting, it was found that the European-grown stock could not survive the long period of transportation across the Atlantic and inland. State nurseries were therefore developed to grow planting stock.

The first State nursery was started in New York to produce seedlings for planting on the forest preserve lands in the Adirondack and Catskill Mountains. Nursery capacities have been increased periodically to meet growing demands, and now millions of trees for planting on both State and private lands are being produced annually in the State nurseries. Trees are being furnished to private landowners at cost. Federal assistance through the Clarke-McNary Act has been given to the States for growing trees supplied to farmers.

The increased demand for trees has created work in the nurseries, and many older workmen have been given suitable year-round employment. Still another large group of workmen has been temporarily employed in planting trees on private lands. In some cases, the men engaged in reforestation are able to earn enough money during the early spring to buy seed, tools, or farming implements needed to plant crops on their nearby lands. Local people engaged in planting for nonresident landowners, are often retained as custodians or agents to prevent the destruction of the plantations by fire and to protect the property from theft and damage.

State nurseries supply planting stock suitable to many types of soil and

other conditions. Generally the plantings are made on relatively poor soils. Only in exceptional cases are trees demanded for good soils such as would be used for agricultural purposes.

In the broad program of upland reclamation undertaken by the States, the planting of forest trees and shrubs has been the primary conservation practice. Prior to 1920 little or no work was being done in the uplands



NEW YORK DEPARTMENT OF CONSERVATION

Planting operations on State forests provide seasonal employment for an army of workers.

by States to control floods. Following the floods of 1927, 1929, and 1936, agitation to initiate a program of watershed protection increased. Numerous studies have indicated the advantages that would result from public acquisition of extensive areas of cut-over forest lands at the headwaters of streams. Where such lands are given intensive fire protection, it has been found that nature is often capable of restoring the natural cover of sprout growth which will effectively impound water in the soil through tree roots, falling debris, leaves, and decaying timber. On critical areas, however, it has proved more effective to undertake a planting program rather than depend upon natural growth of a cover.



UPPER.—Study plot in Connecticut's hardwood forests in which growth under fire protection and management is averaging 1.3 cords per acre per year.

F-348963

LOWER.—One of numerous experimental plantings on Pennsylvania State forests. Study plots are carefully marked and checked to determine the rate of growth.

PENNSYLVANIA DEPARTMENT OF FORESTS AND WATERS

Searching for New Methods

SCIENTIFIC FORESTRY in the United States is a comparatively new phase of land husbandry. While the Government is conducting a comprehensive program of forest research, techniques and methods applicable to all types of lands and conditions have not yet been fully defined. Practices must sometimes be based upon conclusions from small areas. The States have therefore carried on research in forest protection, reforestation, and stand improvement to lay the foundation for their future forestry programs.

The investigations are being administered by well-trained technicians thoroughly familiar with the many phases of forestry. One of the established methods of procedure is to set aside sample plots on sites with different soil or drainage conditions on which various practices are tested, keeping detailed records in order to develop a formula for procedure on larger areas.

Officials in charge of investigations in some States have been introducing new tree species, and have found some desirable trees for planting on the most difficult sites. By and large, however, the native species have proved highly desirable and adaptable for use on 95 percent of the planting lands in the United States.

Investigations have been outlined to cover problems arising in various phases of forestry. In some cases the existing cover of weed-tree species has been removed, leaving seed trees of the better type to reseed the area. Sometimes, the investigations show that native stands of hardwoods which have been cut, burned, and otherwise robbed of value recuperate quickly when competitive weed trees are removed. New problems arising from such conditions as the blowing and flowing of the sands from the hills of northern New York to valuable farms present new subjects for research.

Cooperative research programs between the States and Federal or other agencies have been initiated in numerous State forests. In some of the recent research studies undertaken, the aim is to find forest practices that will increase game food and cover.

Buildings and Improvements



MANY OF THE STATE FOREST properties were developed so rapidly during the early days that adequate structures were not erected. Planned building has been limited largely to the last 5 or 6 years. The State forest ranger is often located 25 or 30 miles from a railroad, and it is necessary that the buildings, supplies, and equipment be adequate to outfit and maintain fire-fighting crews. In the construction of the forest-protection-headquarters units in many States the trend is to include an all-purpose service building that can be used for residence, office, bunk-house, blacksmith shop, garage, or storage. According to State forestry officials, well designed supplementary structures must provide storage stalls for trucks, cars, tractors, and smaller fire-fighting equipment.

The various States have designed different types of buildings for housing the forest-protection organization. The Tennessee Forestry Department considers log cabins most suitable. Log construction was universally used until a few years ago. Recently on lands purchased by the Federal

Government and turned over to the States under long-time leases, dwellings have occasionally been renovated to serve as forest headquarters. On the Battleground State Forest in Virginia, for example, an old colonial brick house is being used. The State Forestry Department of Delaware has restored a large dwelling on the Ellendale State Forest to be used as a residence by the supervisor. An attractive white cottage in a setting of oaks and Spanish moss in South Carolina was constructed by the C. C. C. in 1934 to serve as headquarters on the Lee State Forest.



MINNESOTA DEPARTMENT OF CONSERVATION

State forest-protection headquarters consisting of residence and equipment, storage and service buildings.

Buildings necessary to the operation of the public forests have been provided in most cases at a minimum of cost. It is true, however, that any building adds to administrative expenses because of annual upkeep and repairs. Some States have therefore increased their forestry appropriations to meet these added costs.

Lookout towers with telephone lines connecting the headquarters of the supervisors, rangers, and forest guards have to be maintained when forests are placed under organized fire protection. The costs of administration increase accordingly. The fire towers are usually situated on high points of land in mountainous sections. Building roads and trails to bring in supplies and to provide quick exit in case the lookout men must get away to fight fires is expensive. Such improvements are vital, however, to operation of a forest-protection system covering 100,000 to 300,000 acres



F-348907

Many of these overnight shelters have been constructed in eastern State forests for convenience of hikers.



F-348904

Good roads contribute to successful operation of publicly owned forests and provide a means of access and low-cost transportation of products.

of land with the State forest as the keystone. Owners of private lands within the protection districts rely on the State system for assistance in spotting and suppressing fires.

Planned transportation routes through forests must be maintained to provide easy means of travel not only for visitors, but also for removal of the forest products from remote sections. Past experience has proved that the construction through the forest of permanent roads such as well-drained surfaced auto or truck trails, is least expensive because of the lower maintenance cost. The C. C. C. construction program has given the State forests many excellent, planned engineering improvements, such as roads, trails, and bridges.

Planning Future Programs



IN SOME STATES which went through a boom period of lumbering, cut-over and submarginal lands today add to a complex social and economic situation. It was very evident to a few early far-sighted conservationists that the policies of lumbering and resource exploitation being followed some 35 to 50 years ago would contribute an abnormally large acreage of land to be reforested before it could again produce lumber for local consumption or for export to the markets of the world. The prediction of those early years has now become an actuality.

As has been previously indicated, a few of the States have already defined the pattern of land use in their problem areas by acquiring considerable acreage for forestry purposes. Many have been confronted, however, by difficulties involved in the transfer of abandoned, cut-over, and misused lands from private to State ownership. It is very evident that some areas will present a problem for years to come because present efforts are entirely inadequate to provide extensive reforestation and fire protection.

It is the States which contributed the largest quantities of lumber for building purposes during the period of settlement and industrial expansion that are now in need of long-range conservation programs involving public acquisition of extensive areas of once valuable timberlands. In some States, scientific studies have been made by local agencies to devise an approach to



MICHIGAN DEPARTMENT OF CONSERVATION

On protected forest areas new growth follows logging. Here the old white pine stumps still show, but the young forest is gradually closing in.

public acquisition of land. Definite recommendations have been made on the basis of the data collected. One example is the New York State program based on a study made by Cornell University. The Michigan Department of Conservation has made a similar study of land-utilization problems.

In New York the land was classified and mapped according to its suitability for agriculture or forestry. The lands found unsuited for agricultural purposes were divided into two subclasses: (1) Submarginal farm land adapted to forestry, and (2) idle land, of which a large proportion is woodland. On the basis of this study the State Department of Lands and Forests and other State agencies sponsored a \$20,000,000 bond issue to acquire the lands which were classified as more than 50-percent clear and submarginal. The program included the planting of these lands to trees for future forest crops and their use in propagation of fish and game and for outdoor recreational purposes. The public acceptance of the plan, classification, acquisition, and use of these properties is founded on the present and future needs of this densely populated State. Local communities are now taking an interest in the organized development of the areas. All of the citizens of the State have an interest in restoring the forest cover and are sharing the many benefits accruing from rehabilitating relatively small blocks of forest land.

Michigan has found from its land-utilization survey that many areas formerly covered with forests are no longer capable of regenerating a forest cover. The State must restore it by artificial means. The program here involves the establishment of large nurseries to produce millions of seedlings for replanting, which can be done only through a strong State organization.

In some State forest-acquisition areas, it has been found impractical for the public to acquire all the land because of existing dwellings and small blocks of good land still capable of providing shelter and food for families. In such cases the States must find a way to work out a cooperative program whereby the residents are given an opportunity to continue farming on a small scale, although the greater part of their land is allowed to revert to a protective forest cover. Where the State can enter into a long-term lease with these owners, who are generally wage earners of families, they can be retained to help rehabilitate the area by reforestation and be available at all times for fire protection.

In addition to lands purchased, State forestry departments have gained title to other areas through donations from lumber companies and other owners. Although usually there are possibilities of restoring some of the original cover, certain cultural operations for removal of dead, defective, and diseased trees are necessary on most of the lands received by gift. Under the State's custodianship the forestry program on such lands for many years must, of necessity, consist largely of fire protection, reforestation, and cultural work to increase the forest values and pave the way for more intensive management later.

The suggestion has been made by various forestry groups that small public forests be established in strategic locations in extensive blocks of forest land to provide administrative headquarters for the State forest-protection organization. The National Resources Committee, after surveying conditions in the States, has recommended that State forest ownership be expanded from approximately 13,400,000 acres at this time to include some 77,000,000 acres, mostly in States of dense population where



PENNSYLVANIA DEPARTMENT OF FORESTS AND WATERS

Restoration of forest cover on idle land is the big State forestry job for the future.



Close-up of tree growth completely covering the ground and providing good game cover on strip-mined State forest lands

F-310023

the public will be served through timber production, watershed protection, erosion control, improved wildlife habitats, and recreation.

The States which in the past have materially reduced their annual burn or fire loss on both State and private lands, have had the cooperation of local people and organizations as well as Federal assistance. Continued progress must be based on similar close cooperation of all agencies. One measure of progress will be the use and maintenance of all improvements that have been made. Another will be the support given to strong, permanent forestry field organizations. During 1938, the Forest Service administered a fund of \$2,000,000 for organized fire control in cooperation with the States under the Clarke-McNary law. The total amount being spent annually by all the cooperating agencies for protection outside national forests and parks, as shown in table 2, is about \$7,500,000. Only 60 percent of the total area in need of protection is now being covered and that not intensively enough to prevent heavy losses. Some 155,000,000 acres are without protection, and of this approximately 20 percent burns over annually at a loss estimated at \$40,000,000. This area can be brought under protection only when additional funds become available. Reference to the area and cost figures given in table 3 indicates the wide variation in protection problems in the forested sections of the country. It has been estimated that the total area of 407,000,000 acres of State and private lands needing protection could be adequately protected at an annual cost of \$18,552,000.

TABLE 1.—State forests and State forestry appropriations as shown in data supplied by State foresters, 1937-38

State	Acreage in State forests		Appropriations										
	Number	Area	Admin- istra- tion	Protection			Reforest- ation and nursery	Purchase of forest land	Mainte- nance and im- prove- ment, State forest land	Research	Educa- tion	Exten- sion 1	Total
				Fire	Disease	Insects							
	Units	Acres	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Alabama	23	7,189	4,470	24,780			3,820			360			36,933
Arizona	1	35,000	(2)										100,000
Arkansas	1	5,810	(3)	80,000			5,000				5,000		3,480
California	2	7,980	29,270	226,730			5,550						265,030
Colorado	1	70,826					1,600						4,400
Connecticut	20	69,107			798		2,000		3,776				1,085
Delaware	2	1,975	33,081	41,434									16,460
Florida	5	30,142	19,769	67,743			11,126	8,353	8,278	815	8,350		137,630
Georgia	2	30,142	8,500	57,500			7,000			10,000	7,300		97,500
Idaho	1	448,000	17,900	97,500	34,000								151,005
Illinois	1	3,482	17,700	20,050			20,500	25,000	3,000		(4)		81,870
Indiana	11	39,621	17,307	17,773			22,104	44,949	10,918				116,726
Iowa	3	10,290	3,000				20,000	120,000		2,300	25,000		173,920
Kansas	1	3,000									1,200		4,220
Kentucky	2	18,624	1,838	5,032			5,000		130				12,000
Louisiana	3	11,000	16,600	32,740			5,400		300	2,000	2,820		81,860
Maine	1	13,317	10,356	134,286	6,500	11,000	5,000			1,000	3,000		170,387
Maryland	8	59,142	23,641	23,610			9,632		6,034				3,405
Massachusetts	74	171,300	6,600	66,450			42,000	75,000	122,040				2,730
Michigan	12	1,000,000	10,000	350,000			37,000	200,000			2,000		2,770
Minnesota	31	3,338,238	37,380	283,020	500	9,975	6,500						2,580
Mississippi	1	32,000	3,980	7,960			300				(5)		2,816
Missouri	5	35,073	(6)										340,791
Montana	7	520,000	14,495	55,450				450			690		14,960
Nebraska													
Nevada			211									800	74,195
New Hampshire	113	42,164	15,770	31,771	4,650		8,468					3,220	3,220
New Jersey	8	54,372	24,070	116,580			22,830	1,000	12,588	7,480	(4)	2,190	75,437
									66,765			1,920	240,645

¹ Funds made available through agricultural colleges and State forestry departments.² Incomplete.³ Distributed to other items. Amounts to approximately \$20,000 for all branches.⁴ Included in Administration and Fire Protection.⁵ Included in Protection.⁶ Incomplete because of reorganization.

TABLE 1.—*State forests and State forestry appropriations as shown in data supplied by State foresters, 1937-38—Continued*

State	Acreage in State forests		Appropriations										
	Number	Area	Admin- istra- tion	Protection			Reforest- ation and nursery	Purchase of forest land	Mainte- nance and im- prove- ment, State forest land	Research	Educa- tion	Exten- sion	Total
				Fire	Disease	Insects							
	Units	Acres	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
New Mexico	1	258,000	20,950	298,354	46,275	100,000	220,800	253,000	74,000			5,700	1,019,079
New York	310	2,674,473	5,403	46,930			3,470	40,000	8,514			3,130	109,467
North Carolina			2,000				4,000			1,250		3,200	10,510
North Dakota	9	60,000	8,200	22,430	2,200	1,000	24,700	30,843	12,850	3,500	2,000	5,870	114,593
Ohio			7,150	8,875			6,975						25,000
Oklahoma			22,500	78,100			3,000						103,600
Pennsylvania	23	1,630,937	228,000	75,900			21,000		250,000		5,000	3,560	602,560
Rhode Island	2	352	4,200	10,100			5,000						17,360
South Carolina			10,000	40,000			7,000		844		2,500	5,000	12,500
South Dakota			1,174	79,700			8,400		1,800		1,200	2,658	13,702
Tennessee	8	40,000	26,900	79,700			7,200		1,800		2,000	2,658	121,458
Texas	5	6,400	6,700	76,150			16,000	100	400	2,805	2,000	1,620	94,875
Utah			7,000	17,000	3,000		16,000	21,000	100	6,330	2,040	35,584	75,620
Vermont	21	50,000	7,000	7,000			16,000	21,000	7,000	500	2,500	1,620	74,265
Virginia	1	588	7,780	760,365			3,400		100	1,000	1,000		475,545
Washington	1	355,000	12,000	140,015			12,000	300,000	100				74,265
West Virginia	6	51,345	(²)	123,137			8,500	(³)	186,000	1,000	1,500	3,370	135,007
Wisconsin	5	170,190	18,887	553,371			47,500	9,998		1,166	9,000	3,463	829,385
Wyoming							1,370					1,200	2,630
Total	732	13,415,167	710,252	3,399,200	97,923	172,675	641,585	1,129,693	785,437	60,506	112,654	131,776	7,241,701

² Incomplete.³ Includes \$25,000 appropriated for maintenance of improvements constructed by C. C. C.⁴ Funds available for acquisition, amount not specified.

TABLE 2.—*Expenditures for protection of State and private lands against forest fires during calendar year 1937*
 [Compiled from annual reports from 38 States, 1 Territory]

State	Federal	State		Private		Total, State and private for—		Total, Federal, State, and private for protection	Additional expenditures not reported for Federal reimbursement		Grand total expenditures Federal, State, and private, for protection
		Prevention	Suppression	Prevention	Suppression	Prevention	Protection		Towns and counties	Private	
Alabama	\$40,562.51	\$25,582.41		\$29,976.17	\$254.57	\$55,558.58	\$55,813.15	\$96,375.66		\$18,108.84	\$114,544.50
Arkansas	34,713.62	34,713.71		41,230.45		75,944.16	75,944.16	130,458.78			130,458.78
California	149,803.00	606,802.97	\$16,941.54	13,879.20	2,479.73	614,842.75	631,734.29	781,587.29			781,587.29
Connecticut	13,430.39	33,883.99		2,439.78		42,363.71	58,242.94	73,693.63			73,693.63
Delaware	1,510.33	1,916.09				4,918.91	6,835.00	8,345.93			8,345.93
Florida	78,465.90	128,634.06		49,643.09	86.52	178,277.15	178,363.67	256,829.57	\$8,500.00	27,500.00	292,829.57
Georgia	69,792.33	20,374.36		65,918.10		86,492.46	86,492.46	156,284.79		10,005.25	171,500.04
Idaho (north)	45,452.92	59,438.87		40,161.91	20,934.23	99,600.78	120,533.21	166,046.13		5,343.73	171,389.86
Idaho (south)	4,643.00	12,179.92		11,146.61	300.14	23,326.53	23,626.67	28,269.67			28,269.67
Indiana	5,891.00	20,401.52		846.80		20,401.52	21,248.32	27,239.32			27,239.32
Iowa	14,612.64	13,110.24		1,621.29		13,110.24	14,731.53	29,344.17			29,344.17
Kentucky	44,089.81	68,608.73		28,597.78		97,206.51	97,206.51	141,306.32			141,306.32
Louisiana	43,196.00	132,315.18	9,393.11			132,315.18	141,738.29	184,934.29		10,000.00	214,934.29
Maine	12,301.89	35,822.15	6,497.56		321.94	36,144.09	42,581.65	55,083.54		10,000.00	65,083.54
Massachusetts	24,722.00	80,763.80				80,763.80	80,763.80	105,485.16			239,994.80
Michigan	100,015.00	371,918.50	28,551.66			371,918.50	400,470.16	500,485.16			500,485.16
Minnesota	80,913.00	228,774.87		30,484.48		228,774.87	259,259.35	340,172.35			340,172.35
Mississippi	47,542.26	19,497.43			99.65	72,862.54	72,962.19	120,304.45			120,304.45
Missouri	23,002.00	15,059.31	1,450.70		8,315.12	67,512.92	77,278.74	100,280.74		2,778.55	103,059.29
Montana	1,528.00	204.50			220.96	4,871.32	5,092.28	6,620.28			6,620.28
Nevada	14,312.34	24,908.41	3,737.02			30,154.33	33,891.35	48,203.69	4,484.42	1,162.97	53,851.08
New Hampshire	15,368.00	146,330.65	18,518.68		65.05	146,330.65	164,819.33	180,217.33			180,217.33
New Jersey	1,951.43	3,022.29	30.06			3,229.26	3,324.37	5,275.80		2,023.25	7,299.05
New Mexico	60,583.00	218,338.16	23,465.21		334.30	218,338.16	241,803.37	302,386.37	42,431.94	81,804.41	426,622.72
New York	53,785.48	82,179.21	8,899.33			96,497.69	105,731.32	159,519.80		225,895.82	225,895.82
North Carolina	4,457.82	12,543.62	444.92			12,543.62	12,988.54	17,446.36		345.00	17,446.36
Ohio	15,617.30	9,117.34				15,617.34	15,617.34	31,234.64			31,234.64
Oklahoma	89,493.00	92,640.26			17,314.66	395,857.69	413,172.35	502,665.35		164,956.44	667,621.79
Oregon	48,251.59	118,828.09				118,828.09	175,974.41	224,226.00			224,226.00
Pennsylvania	1,838.75	3,658.33			108.05	90,418.33	90,526.38	131,526.48		10,500.00	142,026.48
Rhode Island	41,000.10	66,225.23				2,772.63	2,797.23	3,572.43			3,572.43
South Carolina	23,991.99	59,885.36				59,885.36	62,656.67	96,648.66			96,648.66
South Dakota	32,584.08	86,630.24				95,220.26	95,220.26	127,804.34			127,804.34
Tennessee	4,370.87	7,077.54				10,367.15	10,367.15	14,738.02	2,609.00	99,512.10	116,859.12
Texas	39,323.16	37,586.60			264.67	40,884.85	54,830.54	94,153.70			94,153.70
Virginia	88,836.00	135,337.74			11,980.95	658,144.86	670,906.26	759,742.26		338,727.39	1,098,469.65
West Virginia	37,833.74	41,455.05				68,740.25	98,650.59	136,504.33			136,504.33
Wisconsin	63,978.00	270,029.33				270,029.33	290,366.91	354,344.91	3,000.00	25,000.00	382,344.91
Hawaii	970.95	3,240.00				3,240.00	3,240.00	4,210.95			4,210.95
Total	1,497,665.30	3,341,041.41	313,688.35	1,306,953.32	60,278.87	4,647,994.73	5,021,961.95	6,519,627.25	222,138.38	872,809.93	7,614,575.56

TABLE 3.—Areas and costs of forest-fire control, 1930 and 1938 ¹

State	1930			1938		
	Forest area needing protection	Estimated cost of protection	Cost per acre	Total forest area protected	Forest area needing protection	Estimated cost of protection
	<i>Acres</i>	<i>Dollars</i>	<i>Cents</i>	<i>Acres</i>	<i>Acres</i>	<i>Dollars</i>
Alabama	22,385,000	575,000	2.6	8,596,303	18,176,952	785,000
Arkansas	22,000,000	484,000	2.2	11,773,993	19,936,140	773,000
California	18,955,000	969,000	5.1	9,540,365	24,786,697	1,699,000
Connecticut	1,500,000	76,000	5.1	1,889,680	1,110,000	110,000
Delaware	325,000	12,000	3.7	325,000	325,000	14,300
Florida	22,900,000	847,000	3.7	3,206,399	20,681,060	1,241,000
Georgia	23,100,000	775,000	3.3	3,616,723	20,561,916	1,026,000
Idaho (north)	3,843,000	120,000	11.0		3,803,300	337,000
Idaho (south)	758,000	27,000	3.6	4,543,119	821,975	43,030
Illinois	2,750,000	77,000	2.8		2,072,933	48,000
Indiana	3,000,000	81,000	2.8	1,997,232	4,242,574	93,000
Kentucky	9,000,000	212,000	2.6	1,099,138	8,590,000	275,000
Louisiana	17,900,000	431,000	2.4	6,476,550	15,719,534	711,000
Maine	14,957,000	342,000	2.3	15,998,560	15,991,000	385,000
Maryland	2,200,000	73,000	3.3	2,223,000	2,223,000	88,000
Massachusetts	3,300,000	169,000	5.1	3,500,000	3,500,000	209,000
Michigan	18,596,000	662,000	3.6	17,563,472	17,595,392	880,000
Minnesota	20,523,000	697,000	3.4	20,079,765	19,891,251	995,000
Mississippi	19,500,000	563,000	2.9	4,708,569	14,833,739	670,000
Missouri	15,750,000	347,000	2.2	1,550,483	11,310,000	233,000
Montana	4,854,000	190,000	3.9	4,569,670	4,854,000	210,000
Nevada	315,000	13,900	4.3	605,523	315,514	22,000
New Hampshire	4,259,000	131,000	3.1	4,298,224	4,277,000	110,000
New Jersey	1,906,000	128,000	6.7	2,069,000	2,069,000	198,000
New Mexico	1,800,000	26,000	1.4	1,746,428	2,460,763	33,000
New York	11,689,000	378,000	3.2	11,342,000	12,799,000	440,000
North Carolina	29,568,000	632,000	3.1	13,938,534	20,020,400	912,000
Ohio	2,160,000	60,000	2.8	1,089,826	2,800,000	82,000
Oklahoma	12,388,000	165,000	1.3	1,463,802	12,732,249	398,000
Oregon	10,685,000	584,000	5.5	12,103,114	12,080,000	1,098,000
Pennsylvania	12,365,000	364,000	2.8	12,542,604	12,576,000	427,000
Rhode Island	280,000	17,000	6.1	417,000	417,000	27,500
South Carolina	12,500,000	378,900	3.0	4,220,092	12,187,301	627,000
South Dakota	79,000	4,500	5.7	214,809	156,188	4,800
Tennessee	10,430,000	245,000	2.3	7,836,837	12,892,558	516,000
Texas	15,637,000	434,000	2.8	8,565,454	15,800,331	554,000
Vermont	3,375,000	57,000	1.7	3,373,471	3,232,000	44,000
Virginia	14,005,000	397,000	2.8	10,894,777	13,775,000	440,000
Washington	12,080,000	632,000	5.2	11,736,203	11,665,000	822,000
West Virginia	9,251,000	312,000	3.4	7,478,998	7,387,000	286,000
Wisconsin	13,187,000	390,000	3.0	11,530,075	13,604,610	680,000
Hawaii	2,557,000	5,173	.2	1,800,021	2,556,982	5,500
Total	419,633,000	13,386,273	3.2	252,739,124	407,620,456	18,552,100

¹ Includes Federal, State, and private expenditures on lands not in Federal ownership.² Watershed areas included.



W / 8